
700 ILLUMINATION

701. POLICY STATEMENT

The purpose of this policy is to provide general guidance as to where ADOT would provide roadway lighting.

710. IMPLEMENTING STATEMENT

The purpose of highway illumination is to promote orderly and safe movement of nighttime traffic by artificially illuminating the roadway. Engineering judgment should be used in determining if lighting will be installed. Cost and readily available electrical service, are major factors in the determination in light installations.

The guideline conditions are for the purpose of establishing a guide on which lighting may be considered. However, the meeting of the guideline conditions does not obligate ADOT to provide lighting. Lighting will be installed by the State only where engineering judgment indicates there are sufficient traffic volumes and/or collisions to satisfy one or more of the conditions set forth where illumination would enhance highway safety.

721 Procedures

721.1 Continuous Freeway Illumination

When practicable, median lighting is preferred. The following data is used as part of an evaluation to appraise the need for freeway illumination:

- (1) Estimated average daily traffic at the time of the opening of the freeway to traffic, for the freeway lanes, each ramp, and each crossroad. This shall be shown on the appropriate traffic volume movement forms.
- (2) Answers to the following questions for freeway projects which are in built-up areas:
 - a. Is lighting on a city street grid visible from ground level or elevated freeways?
 - b. Are the cross streets lighted up to one-half (1/2) mile in each direction from the freeway?
 - c. Are three or more successive interchanges located with an average spacing of three (3) miles or less?
 - d. Is the area under consideration urban?
 - e. Are there three lanes or more in each direction?
 - f. What is the night time number of crashes vs. the day time number of crashes for that section in the past three (3) years?

721.2 Complete or Partial Interchange Illumination

The following data is used as part of an evaluation to appraise the need for complete or partial interchange illumination:

- a. Lighting of intersecting city street visible from ground level or elevated freeways.
- b. Presence of commercial development on the interchange.
- c. The nighttime number of crashes vs. the day time number of for that section in the past three (3) years?

721.3 Freeway to Freeway interchange Illumination

Freeway to Freeway interchange illumination shall utilize high-mast, high pressure sodium illumination.

721.4 Special Considerations

Continuous, complete, or partial interchange lighting, and pedestrian walkway bridge lighting, may be considered to be justified where the local governmental agency finds sufficient benefit in the forms of convenience, safety, policing, community promotion, public relations, etc., to wholly finance the installations, maintenance, and operation of the lighting facilities.

721.5 Conventional Highway Lighting Guidelines

a) Intersection Lighting

The following data is used to evaluate the need for conventional highway lighting:

1. Pedestrian and vehicular traffic counts.
2. Availability of electrical service. Where electrical service is available only at excessive cost, consideration should be given to deferment of the installation, unless a benefit/cost analysis indicates a ratio of one or greater.
3. Summary of crashes for a three (3) year period.

b) Continuous Lighting on Conventional Highways

Continuous lighting on conventional highways is considered to be justified where local agencies find sufficient benefit in the forms of convenience, safety, policing, community promotion, public relations, etc. to pay the cost of installation, maintenance, and operation of the lighting. Continuous lighting may be permitted by the State after the consideration of the following conditions:

1. Is lighting on a city street grid visible from highway?
2. Are the cross streets lighted up to one-half (1/2) mile in each direction from the highway?

3. Is the area under consideration urban?
4. What is the night time number of crashes vs. the day time number for that section in the past three (3) years?

c) Intersections on Conventional Highways

Illumination at intersections on conventional highways should be considered using the following data:

1. Pedestrian and vehicular traffic counts.
2. Availability of electrical service. Where electrical service is available only at excessive cost, consideration should be given to deferment of the installation, unless a benefit/cost analysis indicates a ratio of one or greater.
3. An average of three or more crashes per year over the three most current years have occurred under conditions other than daylight.
4. The intersection is signalized.
5. The intersection has raised channelization and/or complex geometrics.

722. Provisions for Future Lighting

722.1 Structures

Provision for future lighting shall be made on structures which are within urban areas and on others which may require lighting in the future.

722.2 Roadway

Underground conduit roadway crossings and pull boxes should be installed under a highway construction contract where it appears that lighting may be justified in the future.

722.3 Signalization

Intersections which are projected to be signalized, should use light poles that can be employed as future traffic signal supports.

723. General Design Approach

723.1 ADOT Standard Drawings should be used unless otherwise specified.

723.2 Illuminance

Illuminance shall be the primary design method practiced for ADOT projects.

723.3 Techniques of Illumination Design

ADOT or the designer may require veiling luminance calculations in lieu or in addition to illuminance calculations for design.

723.4 Level and Uniformity of Illuminance and Luminance

Standard lighting shall be a High Pressure Sodium light source.

Wattage typically is :

High Mast – 400watt.

Vertical Offset installations – typically 250 watt and not to exceed 400 watt.

Horizontal Mount – typically 150 watt and 250 watt, not to exceed 400 watt.

724. Illumination Responsibility and Financing

The Arizona Department of Transportation's participation in financing illumination on State highways will be as set forth below. If local governmental agencies desire more expensive equipment than that normally used by the State, the additional cost must be financed by the local agency. On Federal-Aid projects, Federal participation will be requested when the desirability of providing lighting is established in accordance with the warrant conditions set forth in this guide.

724.1 Freeways

The cost of installing and maintaining lighting on freeways will be borne entirely by the State. The State financing will include all necessary lighting on the freeway and connecting ramps, including where necessary, lighting under structures. If other governmental agencies desire additional lighting, the installation, maintenance, and operation costs must be borne by the sponsoring agency.

724.2 Existing Grade Intersections

The installation of lighting at intersections at grade will normally be financed jointly by the State, the City, and/or County in a manner to be determined by the agencies and stated in a formal agreement between the parties involved. Maintenance and operation costs will normally be assumed by the local agency. The need for lighting will be established in accordance with the warrant conditions stated in this guide.

724.3 New At Grade Intersections

The installation cost of lighting at intersections at grade on new construction will be borne entirely by the State. The maintenance and operation costs of lighting of new grade intersections will normally be assumed by the local agency. The need for lighting will be established in accordance with the guideline conditions set forth in this policy.

724.4 Special Consideration Lighting

Where engineering studies show special conditions existing on roadways other than freeways, the State may assume the total financial responsibility for lighting, if detailed study indicates that such lighting will correct the deficiency until major reconstruction can be undertaken. The need for lighting will be established in accordance with the guideline conditions set forth in this Policy.

724.5 Lighting by Other Agencies

When fixed lighting on State highways is desired by other governmental agencies, lighting may be permitted, provided the following conditions are met:

- a. The State will not be obligated to bear any portion of the costs for its construction, maintenance, or operation.
- b. Full authority is retained by the State to exercise control in all matters relating both to design and operation of such installations.
- c. Any such installation shall be subject to approval by the State, and will require an encroachment permit.
- d. The proposed lighting shall in no way detract from or nullify the effectiveness of any lighting placed by the State, or interfere with the safe and orderly movement of traffic.
- e. On expressways the installations must incorporate metal standards with underground wiring. On conventional roadways these installations may be made on existing wood poles with overhead wiring.

730. APPROVAL

The installation of illumination shall be approved by the State Traffic Engineer.

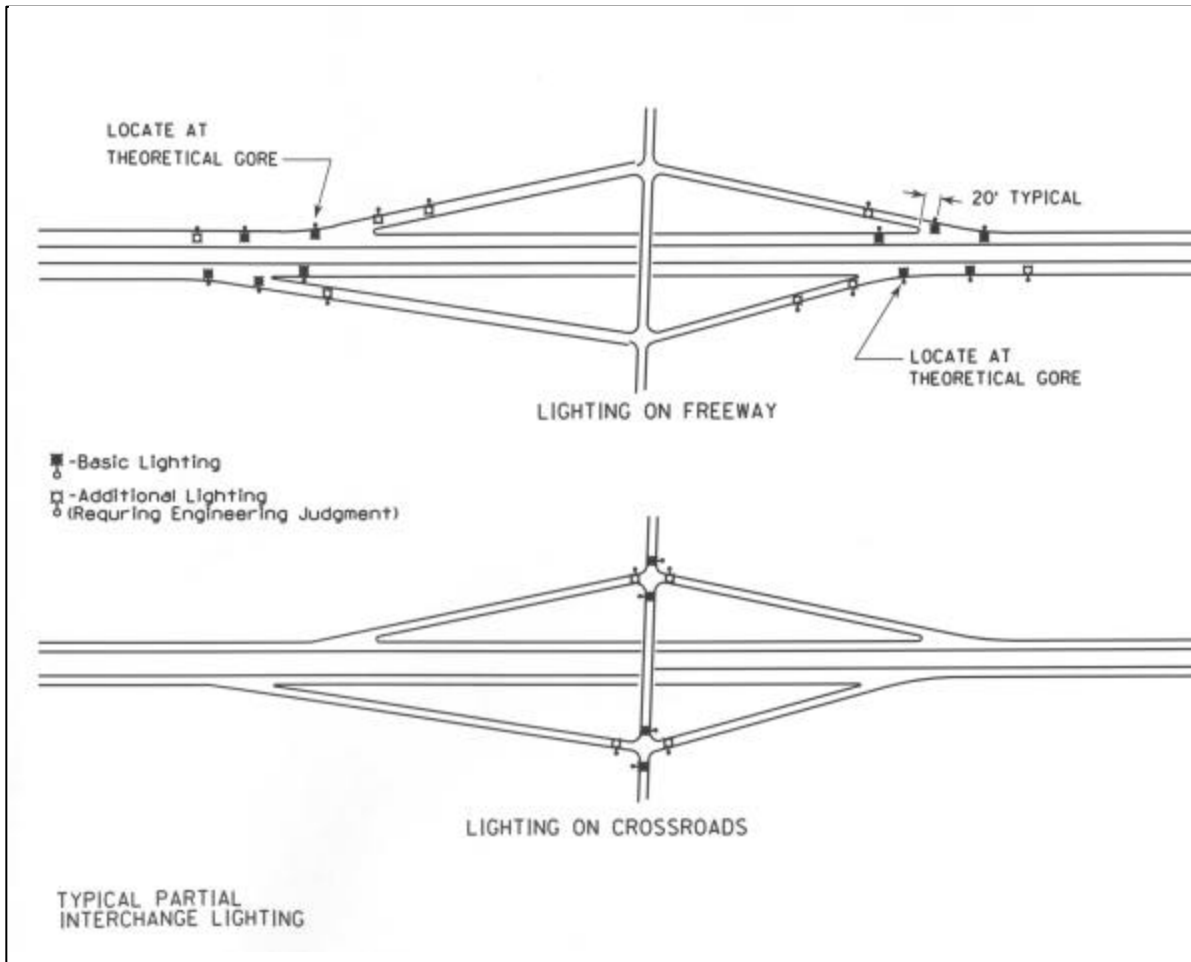


FIGURE 1

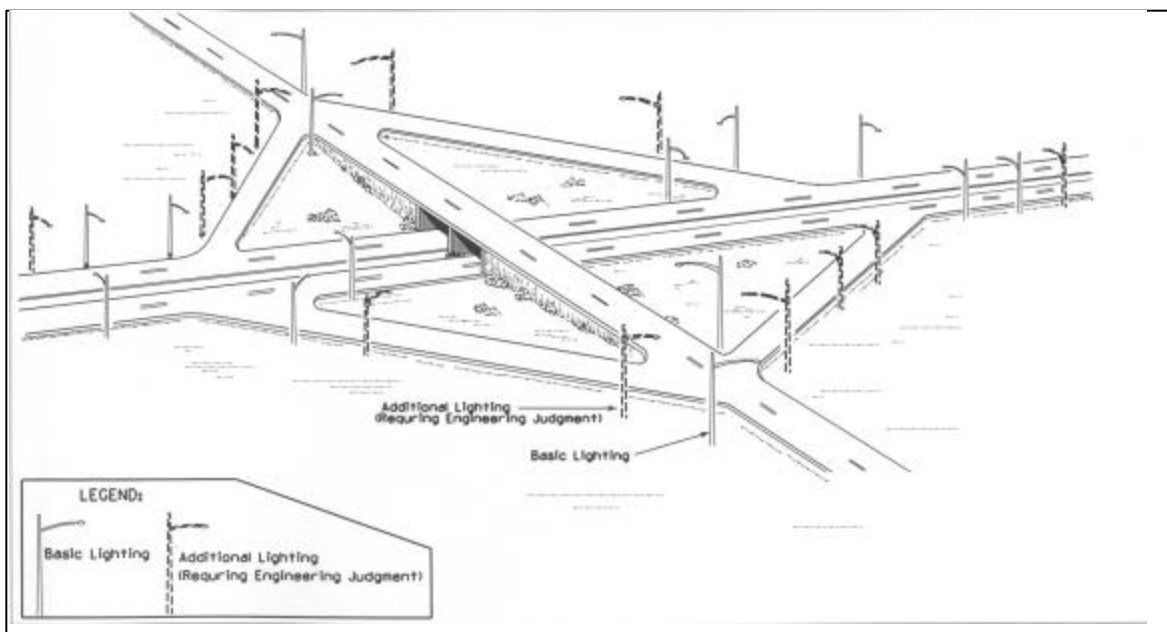


FIGURE 2

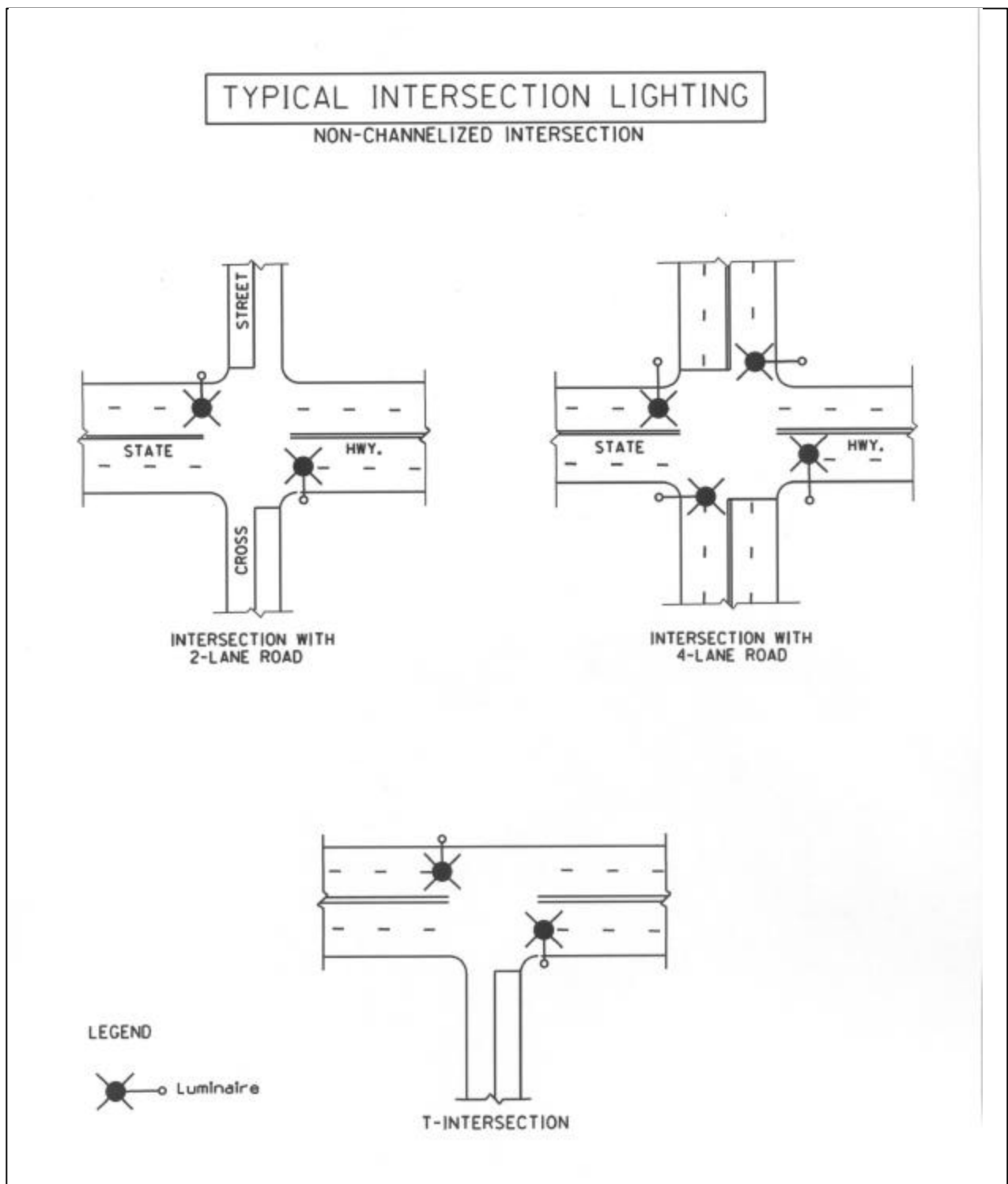


FIGURE 3

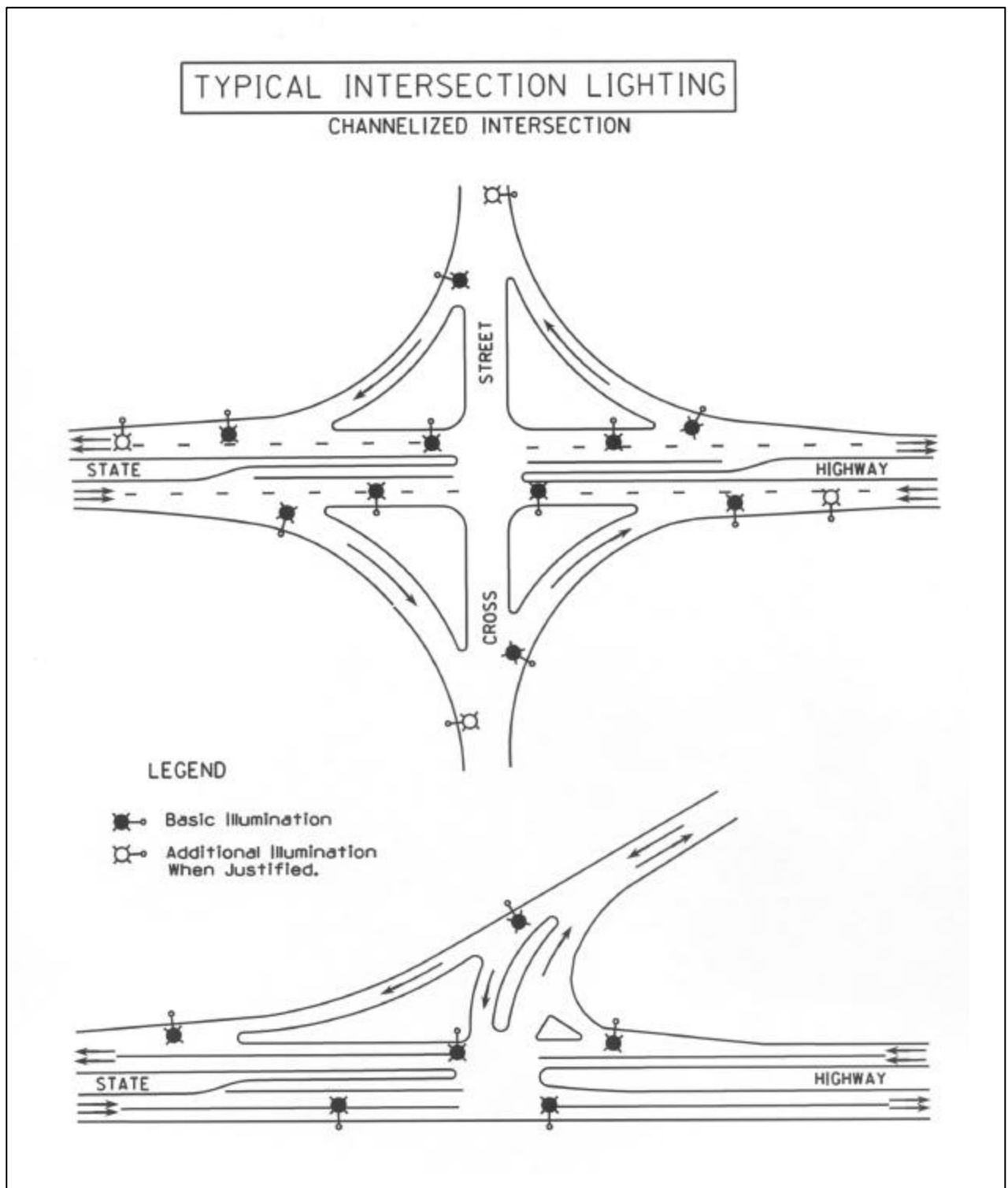


FIGURE 4